



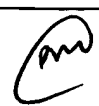
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,010	08/27/2003	Attila Kovacs	NEC0255US	6058
33031	7590	09/21/2005	EXAMINER	
CAMPBELL STEPHENSON ASCOLESE, LLP 4807 SPICEWOOD SPRINGS RD. BLDG. 4, SUITE 201 AUSTIN, TX 78759			DINH, PAUL	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/650,010	KOVACS ET AL. 	
	Examiner	Art Unit	
	Paul Dinh	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/27/03 TO 3/21/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/27/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 1, 21, 34, and 49 are objected to because an application/intended use/purpose should be recited in the preambles of these claims.

Claim 39 is objected to because it is a duplication of claim 38.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 12, 15-16, 30-31, 43, 45-46, 51-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12, 15, 30, 43, 45, 51-53 are rejected because "likely" (in claims 12, 43), "likelihood" (in claims 15, 30, 45), and "could have been" (in claims 51) render the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

Claims 16, 31, 46 are rejected because, according to the claims, the limitation "the new (longer) wire has less delay than the wire removed" is not clear as to how a longer wire has less delay than a shorter (removed) wire.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3-21, 23-34, 36-51, and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Doeswamy et al (USP 5784600)
(Claim 1 and similarly recited claims 21, 34, 49, and 51)
detecting a timing violation in a timing path included in an IC design (fig 1-2, 9-12);
removing one of one or more wires included in the timing path, wherein the one of the one or more wires couples two nodes included in the IC design (fig 2, 11-12); and

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Routing a new wire between the two nodes, wherein the new wire is longer than the removed one of the one or more wires (fig 2, 11-12).

(Claims 3-6, 23-26, 36-39, 50, 53) further comprising: calculating timing information for the one or more wires included in the timing path (fig 1-2, 4-5, 7-13); and selecting the one of the one or more wires for removal dependent on the timing information (fig 1-2, 4-5, 7-13); wherein the timing information includes delay information (fig 1B, 2B, 9, 12-13); further comprising selecting the one of the one or more wires for removal in response to the delay information indicating that the one of the one or more wires has a greater delay than other ones of the one or more wires included in the timing path (fig 1-2, 4-5, 7-13); further comprising: selecting the one of the one or more wires to remove in response to the delay information indicating that a delay of the one of the one or more wires exceeds a threshold delay (fig 1-2, 4-5, 7-13).

(Claims 7-10, 27-28, 40-41) the timing information includes slew information and delay information for each of the one or more wires included in the timing path (fig 1-2, 4-13); further sorting the one or more wires included in the timing path based on the slew information and the delay information (fig 1-2, 4-13); dependent on an outcome of said sorting, selecting the one of the one or more wires for removal (fig 1-2, 4-13); further comprising: sorting the one or more wires dependent on the timing information; and selecting the one of the one or more wires for removal in response to said sorting (fig 1-2, 4-13).

(Claims 11-12, 42-43) wherein said removing is dependent on a location of the one of the one or more wires relative to one or more other wires included in the IC design (fig 2, 4-5, 7-13); further comprising: selecting the one of the one or more wires for removal in response to determining that a different one of the one or more wires has so many neighboring wires that if the different one of the one or more wires is replaced with a new wire, the new wire is likely to cause additional timing violations due to crosstalk with one of the neighboring wires (fig 1-2, 7-12)

(Claim 13) wherein said detecting is performed by a sign-off tool (see checking/verification/simulation tool in fig 10).

(Claims 14, 29, 44) further comprising: removing more than one of the one or more wires included in the timing path (fig 1-2, 5, 7-8, 11-12), wherein each of the more than one of the one or more wires couples a respective pair of a plurality of pairs of nodes; an routing a new wire between each pair included in the plurality of pairs of nodes (fig 1-2, 5, 7-8, 11-12).

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(Claims 15, 30, 45) wherein said routing comprises routing the new wire so that a space exists between the new wire and any other wires (fig 1-2, 9-12), wherein a size of the space is selected to reduce a likelihood that the new wire will experience crosstalk effects with any other wires (fig 1-2, 9-12).

(Claims 16, 31, 46) wherein the new wire has less delay and less slew than the one of the one or more wires removed by said removing (fig 1-2, 9-12).

(Claims 17, 32, 47) wherein a driver (fig 1-2, 4-13) for driving signals on the new wire has substantially a same size as a driver (fig 1-2, 4-13) for driving signal on the one of the one or more wires removed by said removing.

(Claims 18, 33, 48) wherein said routing (fig 2, 11-12) does not introduce any new timing violations into the IC design.

(Claims 19-20) further comprising: performing said detecting, said removing, and said routing for a plurality of additional timing paths, wherein no new buffers are added, no existing drivers are resized, and no existing buffers are resized or moved in response to detection of the timing violations in the timing path; and the plurality of additional timing paths (fig 1-2, 4-13); and subsequent to said performing, no timing violations are detected in a circuit design that includes the timing path and the plurality of additional timing paths (fig 1-2, 4-13); wherein a single wire is selected as the one of the one or more wires to be removed for more than one timing path of the plurality of additional timing paths (fig 1-2, 4-13).

2. Claim 1 and similarly recited claims 21, 34, 49, and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Tamarkin et al (USP 6256769)

Detecting a timing violation in a timing path included in an IC design (rules/constraints/requirements regarding timing/delay/load/length and routing rules that control timing violations in this prior art);

Removing one of one or more wires included in the timing path, wherein the one of the one or more wires couples two nodes included in the IC design (col 2 line 50+, col 9 lines 1-11); and

Routing a new wire between the two nodes, wherein the new wire is longer than the removed one of the one or more wires (col 2 line 50++, col 9 lines 1-11).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a), which forms the basis for all obviousness rejections, set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such

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that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 22, 35, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over one or More of Doreswamy et al (USP 5784600) and Tamarkin et al (USP 6256769) in view of one or more of: Beyne et al (US patent application Publication No. 2003/0060034) and Muddu et al (USP 6353917)

Doreswamy and Tamarkin disclose substantially all the elements in claims 2, 22, 35, and 52 including traces on different layers to prevent crosstalk (Tamarkin col 6 lines 33-36) except routing a wire through a higher routing layer as claimed.

Beyne discloses routing a wire through a higher routing layer in paragraphs 0070; and

Muddu discloses routing a wire through a higher routing layer in col 12 lines 58-62

It would have been obvious to one of ordinary skill in the art at the time of the invention to route a wire through a higher routing layer because routing a wire through a higher routing layer can avoid crosstalk (Beyne, paragraphs 0070) and/or due to the fact that critical signal need special attention are usually routed in higher metal layers and this help reduce the effect of interconnects coupling (Muddu col 2 lines 58-62).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Dinh whose telephone number is 571-272-1890. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Paul Dinh
Patent Examiner

